MEMORANDUM

TO: Mr. Addison Rice
Anderson, Mulholland and Associates

DATE: July 8, 2015

FROM: R. Infante

FILE: 1412151AR1

checked by RI
7/14/15

RE: Data Validation
Air samples
SDG: 1412151AR1

SUMMARY

Full validation was performed on the data for several gas samples analyzed for selected volatile organic compounds by method Compendium Method TO-15: Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999. The samples were collected at the Bristol Myer Squib-Building 5 VI facility, Humacao, PR site on December 08-09, 2014 and submitted to Eurofins Air Toxics, Inc. of Folson, California that analyzed and reported the results under delivery groups (SDG) 1412151AR1.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: Compendium Method TO-15. Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999; Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted. In general the data is valid as reported and may be used for decision making purposes.

The data results are acceptable for use. The following results were qualified as estimated (J): 1,2,4-trichlorobenzene in all samples due to the % RSD for the calibration factor outside method performance criteria. Results for Ethanol, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, alpha-chlrotoluene and Hexachlorobutadiene are qualified as estimated (J) in all sample due to % D in continuing calibration outside method performance criteria. Detected results for Toluene, 2-Propanol, and Acetone in samples B5IA-5 (2014), B5IA-3D (2014), and B5IA-3 (2014) exceed the instrument calibration range and are considered estimated values. Result qualified as an estimated value (J) by the validator and qualified (E) by the laboratory. Results for 2,2,4-trimethylpentane and 1,2,4-trimethylbenzene qualified as estimated (J) due to RPD exceeding laboratory control limits and method criteria.

The laboratory issued the following statement:

"The work order was re-issued on July 1, 2015 for the following reasons:

1. To report additional compounds per client's request. While the initial report met the laboratory data quality requirements for the originally requested compounds, the additional compounds were not evaluated for quality compliance at the time of sample analysis. As a result, the re-issued report contains qualified data for several of the added compounds.

2. All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

3. To report estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives."

SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B5IA-5 (2014)	1412151AR1-01A	12/08/2014	Air	VOCs
B5IA-3D (2014)	1412151AR1-02A	12/09/2014	Air	VOCs
B5IA-3 (2014)	1412151AR1-03A	12/09/2014	Air	VOCs
B5IA-11 (2014)	1412151AR1-04A	12/09/2014	Air	VOCs
B5IA-9 (2014)	1412151AR1-05A	12/09/2014	Air	VOCs

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Canister cleaning certification criteria
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

Sample BSIA-3D (2014) was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

Initial and Continuing Calibrations

VOCs (Method TO-15)
The percent relative standard deviations (%RSDs) and response factors (RFs) of all target analytes were within the QC acceptance criteria in the initial calibration except for the compounds listed below. Correlation coefficients (r^2) of target analytes were within the QC acceptance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard. The following compounds did not meet the method calibration/continued calibration criteria:

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria except for the followings:				
10/06/14	V14L1006D	34 % RSD	1,2,4-trichlorobenzene	All samples.
12/16/14	V121602.d	38 % D	Ethanol	
		38 % D	1,2-dichlorobenzene	
		32 % D	1,3-dichlorobenzene	
		37 % D	1,4-dichlorobenzene	
		33 % D	alpha-chlorotoluene	
		39 % D	Hexachlorobutadiene	

Results were qualified as estimated (J) in all samples.

Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks except for the followings:

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION/ UNIT
12/16/14	1412151AR1-09A	Air/low	Hexane	0.10 ppbv
			1,4-dichlorobenzene	0.038 ppbv
			alpha-chlorotoluene	0.10 ppbv
			1,2-dichlorobenzene	0.046 ppbv
			1,2,4-trichlorobenzene	0.12 ppbv
			Hexachlorobutadiene	0.043ppbv

No action taken, 5x concentration in blank < the concentration found in samples.

Summa canister met cleaning certification criteria.

No trip/field blank analyzed with this data package.

Surrogate Spike Recovery

The surrogate recoveries were within the laboratory QC acceptance limits in all samples analyzed.

Internal Standard Performance

VOCs and Methanol (TO-15)
Samples were spiked with the method specified internal standard. Internal standard are performance and retention times met the QC acceptance criteria in all sample analyses and calibration standards.

Laboratory/Field Duplicate Results

Laboratory duplicates (LCS/LCSD) were analyzed as part of this data set. Target analytes meet the RPD performance criteria of + 25 % for analytes 5 x SQL. Field duplicates were samples BSIA-3/BSIA-3D, RPD performance criteria of + 25 % for analytes 5 x SQL for all analytes except for the followings:

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
2,2,4-trimethylpentane	0.04952	ND	0.28	NR	Qualify results (J) in sample and duplicate.
1,2,4-trimethylbenzene	0.03467	0.41	0.30	31	Qualify results (J) in sample and duplicate.

LCS/LCSD Results

VOCs
LCS/LCSD (blank spike) associated with this data package were analyzed by the laboratory. Recoveries and RPD within laboratory control limits except for the following:

LCS ID	COMPOUND	% R	QC LIMIT
1412151AR1-11A/-11AA	1,2,4-trimethylbenzene	143%/142%	70 - 130
	alpha-chlorotoluene	167%/159%	70 - 130
	Ethanol	149%/152%	70 - 130

No action taken, professional judgment.

Quantitation Limits and Sample Results

Dilution was performed on sample BSIA-5 (2014) and BSIA-3 (2014) due to the presence of high level target species. All other samples diluted by a factor of less than 2.

Detected results for Toluene, 2-Propanol, and Acetone in samples B5IA-5 (2014), BSIA-3D (2014), and BSIA-3 (2014) exceed the instrument calibration range and are considered estimated values.

Calculations were spot checked.

Certification

The following samples 1412151AR1-01A; 1412151AR1-02A; 1412151AR1-03A; 1412151AR1-04A; and 1412151AR1-05A were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid. Some of the results were qualified.

Rafael Infante
Chemist License 1888

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Client Sample ID: BSIA-5 (2014)

Lab ID#: 1412151AR1-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121611r1**	**Date of Collection:**	**12/8/14 3:55:00 PM**
Dil. Factor:	**7.90**	**Date of Analysis:**	**12/16/14 03:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.0	Not Detected		20	Not Detected
Freon 114	0.79	Not Detected		5.5	Not Detected
Chloromethane	4.0	0.93 J		8.2	1.9 J
Vinyl Chloride	0.79	Not Detected		2.0	Not Detected
1,3-Butadiene	0.79	Not Detected		1.7	Not Detected
Bromomethane	4.0	Not Detected		15	Not Detected
Chloroethane	4.0	Not Detected		10	Not Detected
Freon 11	0.79	Not Detected		4.4	Not Detected
Ethanol	4.0	1400 J0E	J	7.4	2700 J0E
Freon 113	0.79	Not Detected		6.0	Not Detected
1,1-Dichloroethene	0.79	Not Detected		3.1	Not Detected
Acetone	4.0	590 E	J	9.4	1400 E
2-Propanol	4.0	410 E	J	9.7	1000 E
Carbon Disulfide	4.0	Not Detected		12	Not Detected
3-Chloropropene	4.0	Not Detected		12	Not Detected
Methylene Chloride	1.6	170		5.5	590
Methyl tert-butyl ether	0.79	3.7		2.8	13
trans-1,2-Dichloroethene	0.79	Not Detected		3.1	Not Detected
Hexane	0.79	Not Detected		2.8	Not Detected
1,1-Dichloroethane	0.79	Not Detected		3.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.0	Not Detected		12	Not Detected
cis-1,2-Dichloroethene	0.79	Not Detected		3.1	Not Detected
Tetrahydrofuran	4.0	7.9		12	23
Chloroform	0.79	0.26 J		3.8	1.3 J
1,1,1-Trichloroethane	0.79	Not Detected		4.3	Not Detected
Cyclohexane	0.79	Not Detected		2.7	Not Detected
Carbon Tetrachloride	0.79	Not Detected		5.0	Not Detected
2,2,4-Trimethylpentane	4.0	Not Detected		18	Not Detected
Benzene	0.79	0.26 J		2.5	0.85 J
1,2-Dichloroethane	0.79	Not Detected		3.2	Not Detected
Heptane	0.79	7.0		3.2	29
Trichloroethene	0.79	Not Detected		4.2	Not Detected
1,2-Dichloropropane	0.79	Not Detected		3.6	Not Detected
1,4-Dioxane	0.79	Not Detected		2.8	Not Detected
Bromodichloromethane	0.79	Not Detected		5.3	Not Detected
cis-1,3-Dichloropropene	0.79	Not Detected		3.6	Not Detected
4-Methyl-2-pentanone	0.79	160		3.2	660
Toluene	0.79	340 E	J	3.0	1300 E
trans-1,3-Dichloropropene	0.79	Not Detected		3.6	Not Detected
1,1,2-Trichloroethane	0.79	Not Detected		4.3	Not Detected
Tetrachloroethene	0.79	Not Detected		5.4	Not Detected
2-Hexanone	4.0	Not Detected		16	Not Detected

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Client Sample ID: BSIA-5 (2014)

Lab ID#: 1412151AR1-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121611r1**	**Date of Collection:**	**12/8/14 3:55:00 PM**
Dil. Factor:	**7.90**	**Date of Analysis:**	**12/16/14 03:27 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.79	Not Detected		6.7	Not Detected
1,2-Dibromoethane (EDB)	0.79	Not Detected		6.1	Not Detected
Chlorobenzene	0.79	Not Detected		3.6	Not Detected
Ethyl Benzene	0.79	47		3.4	200
m,p-Xylene	0.79	160		3.4	710
o-Xylene	0.79	15		3.4	63
Styrene	0.79	0.96		3.4	4.1
Bromoform	0.79	Not Detected		8.2	Not Detected
Cumene	0.79	Not Detected		3.9	Not Detected
1,1,2,2-Tetrachloroethane	0.79	Not Detected		5.4	Not Detected
Propylbenzene	0.79	Not Detected		3.9	Not Detected
4-Ethyltoluene	0.79	0.28 J		3.9	1.4 J
1,3,5-Trimethylbenzene	0.79	Not Detected		3.9	Not Detected
1,2,4-Trimethylbenzene	0.79	0.42 J	כ	3.9	2.1 J
1,3-Dichlorobenzene	0.79	Not Detected UJ	בכ	4.8	Not Detected UJ
1,4-Dichlorobenzene	0.79	Not Detected UJ	כב	4.8	Not Detected UJ
alpha-Chlorotoluene	4.0	Not Detected UJ	כג	20	Not Detected UJ
1,2-Dichlorobenzene	0.79	Not Detected UJ	ככ	4.7	Not Detected UJ
1,2,4-Trichlorobenzene	4.0	Not Detected	ככ	29	Not Detected
Hexachlorobutadiene	4.0	Not Detected UJ	כג	42	Not Detected UJ
Naphthalene	4.0	Not Detected		21	Not Detected

J = Estimated value.
E = Exceeds instrument calibration range.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: BSIA-3D (2014)

Lab ID#: 1412151AR1-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121612r1**	**Date of Collection:**	**12/9/14 9:30:00 AM**
Dil. Factor:	**2.87**	**Date of Analysis:**	**12/16/14 04:13 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.4	0.44 J		7.1	2.2 J
Freon 114	0.29	Not Detected		2.0	Not Detected
Chloromethane	1.4	1.0 J		3.0	2.1 J
Vinyl Chloride	0.29	Not Detected		0.73	Not Detected
1,3-Butadiene	0.29	Not Detected		0.63	Not Detected
Bromomethane	1.4	Not Detected		5.6	Not Detected
Chloroethane	1.4	Not Detected		3.8	Not Detected
Freon 11	0.29	0.22 J		1.6	1.2 J
Ethanol	1.4	440 J0E	J	2.7	830 J0E
Freon 113	0.29	Not Detected		2.2	Not Detected
1,1-Dichloroethene	0.29	Not Detected		1.1	Not Detected
Acetone	1.4	270 E	J	3.4	650 E
2-Propanol	1.4	170 E	J	3.5	410 E
Carbon Disulfide	1.4	Not Detected		4.5	Not Detected
3-Chloropropene	1.4	Not Detected		4.5	Not Detected
Methylene Chloride	0.57	74		2.0	260
Methyl tert-butyl ether	0.29	1.7		1.0	6.2
trans-1,2-Dichloroethene	0.29	Not Detected		1.1	Not Detected
Hexane	0.29	0.26 J		1.0	0.92 J
1,1-Dichloroethane	0.29	Not Detected		1.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1.4	0.87 J		4.2	2.6 J
cis-1,2-Dichloroethene	0.29	Not Detected		1.1	Not Detected
Tetrahydrofuran	1.4	4.0		4.2	12
Chloroform	0.29	0.24 J		1.4	1.2 J
1,1,1-Trichloroethane	0.29	Not Detected		1.6	Not Detected
Cyclohexane	0.29	Not Detected		0.99	Not Detected
Carbon Tetrachloride	0.29	Not Detected		1.8	Not Detected
2,2,4-Trimethylpentane	1.4	0.28 J	J	6.7	1.3 J
Benzene	0.29	0.20 J		0.92	0.63 J
1,2-Dichloroethane	0.29	Not Detected		1.2	Not Detected
Heptane	0.29	3.1		1.2	13
Trichloroethene	0.29	Not Detected		1.5	Not Detected
1,2-Dichloropropane	0.29	Not Detected		1.3	Not Detected
1,4-Dioxane	0.29	Not Detected		1.0	Not Detected
Bromodichloromethane	0.29	Not Detected		1.9	Not Detected
cis-1,3-Dichloropropene	0.29	Not Detected		1.3	Not Detected
4-Methyl-2-pentanone	0.29	79		1.2	320
Toluene	0.29	150 E	J	1.1	570 E
trans-1,3-Dichloropropene	0.29	Not Detected		1.3	Not Detected
1,1,2-Trichloroethane	0.29	Not Detected		1.6	Not Detected
Tetrachloroethene	0.29	Not Detected		1.9	Not Detected
2-Hexanone	1.4	Not Detected		5.9	Not Detected

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Client Sample ID: BSIA-3D (2014)

Lab ID#: 1412151AR1-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121612r1**	**Date of Collection:**	**12/9/14 9:30:00 AM**
Dil. Factor:	**2.87**	**Date of Analysis:**	**12/16/14 04:13 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.29	Not Detected		2.4	Not Detected
1,2-Dibromoethane (EDB)	0.29	Not Detected		2.2	Not Detected
Chlorobenzene	0.29	Not Detected		1.3	Not Detected
Ethyl Benzene	0.29	22		1.2	95
m,p-Xylene	0.29	78		1.2	340
o-Xylene	0.29	7.1		1.2	31
Styrene	0.29	0.71		1.2	3.0
Bromoform	0.29	Not Detected		3.0	Not Detected
Cumene	0.29	Not Detected		1.4	Not Detected
1,1,2,2-Tetrachloroethane	0.29	Not Detected		2.0	Not Detected
Propylbenzene	0.29	Not Detected		1.4	Not Detected
4-Ethyltoluene	0.29	0.12 J		1.4	0.59 J
1,3,5-Trimethylbenzene	0.29	Not Detected		1.4	Not Detected
1,2,4-Trimethylbenzene	0.29	0.30	J	1.4	1.5
1,3-Dichlorobenzene	0.29	Not Detected UJ	UJ	1.7	Not Detected UJ
1,4-Dichlorobenzene	0.29	Not Detected UJ	UJ	1.7	Not Detected UJ
alpha-Chlorotoluene	1.4	Not Detected UJ	UJ	7.4	Not Detected UJ
1,2-Dichlorobenzene	0.29	Not Detected UJ	UJ	1.7	Not Detected UJ
1,2,4-Trichlorobenzene	1.4	Not Detected	UJ	11	Not Detected
Hexachlorobutadiene	1.4	Not Detected UJ	UJ	15	Not Detected UJ
Naphthalene	1.4	Not Detected		7.5	Not Detected

J = Estimated value.
E = Exceeds instrument calibration range.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: BSIA-3 (2014)

Lab ID#: 1412151AR1-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121613r1**	**Date of Collection:**	**12/9/14 9:20:00 AM**
Dil. Factor:	**2.98**	**Date of Analysis:**	**12/16/14 04:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.5	0.43 J		7.4	2.1 J
Freon 114	0.30	Not Detected		2.1	Not Detected
Chloromethane	1.5	0.83 J		3.1	1.7 J
Vinyl Chloride	0.30	Not Detected		0.76	Not Detected
1,3-Butadiene	0.30	Not Detected		0.66	Not Detected
Bromomethane	1.5	Not Detected		5.8	Not Detected
Chloroethane	1.5	Not Detected		3.9	Not Detected
Freon 11	0.30	0.19 J		1.7	1.1 J
Ethanol	1.5	530 J0E	J	2.8	1000 J0E
Freon 113	0.30	0.060 J		2.3	0.46 J
1,1-Dichloroethene	0.30	Not Detected		1.2	Not Detected
Acetone	1.5	320 E	J	3.5	750 E
2-Propanol	1.5	200 E	J	3.7	500 E
Carbon Disulfide	1.5	Not Detected		4.6	Not Detected
3-Chloropropene	1.5	Not Detected		4.7	Not Detected
Methylene Chloride	0.60	88		2.1	310
Methyl tert-butyl ether	0.30	2.0		1.1	7.1
trans-1,2-Dichloroethene	0.30	Not Detected		1.2	Not Detected
Hexane	0.30	0.19 J		1.0	0.66 J
1,1-Dichloroethane	0.30	Not Detected		1.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1.5	0.81 J		4.4	2.4 J
cis-1,2-Dichloroethene	0.30	Not Detected		1.2	Not Detected
Tetrahydrofuran	1.5	4.6		4.4	14
Chloroform	0.30	0.21 J		1.4	1.0 J
1,1,1-Trichloroethane	0.30	Not Detected		1.6	Not Detected
Cyclohexane	0.30	0.12 J		1.0	0.41 J
Carbon Tetrachloride	0.30	Not Detected		1.9	Not Detected
2,2,4-Trimethylpentane	1.5	Not Detected	J	7.0	Not Detected
Benzene	0.30	0.20 J		0.95	0.65 J
1,2-Dichloroethane	0.30	Not Detected		1.2	Not Detected
Heptane	0.30	3.6		1.2	15
Trichloroethene	0.30	Not Detected		1.6	Not Detected
1,2-Dichloropropane	0.30	Not Detected		1.4	Not Detected
1,4-Dioxane	0.30	Not Detected		1.1	Not Detected
Bromodichloromethane	0.30	Not Detected		2.0	Not Detected
cis-1,3-Dichloropropene	0.30	Not Detected		1.4	Not Detected
4-Methyl-2-pentanone	0.30	100		1.2	410
Toluene	0.30	190 E	J	1.1	710 E
trans-1,3-Dichloropropene	0.30	Not Detected		1.4	Not Detected
1,1,2-Trichloroethane	0.30	Not Detected		1.6	Not Detected
Tetrachloroethene	0.30	Not Detected		2.0	Not Detected
2-Hexanone	1.5	Not Detected		6.1	Not Detected

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Client Sample ID: BSIA-3 (2014)

Lab ID#: 1412151AR1-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121613r1**	**Date of Collection:**	**12/9/14 9:20:00 AM**
Dil. Factor:	**2.98**	**Date of Analysis:**	**12/16/14 04:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.30	Not Detected		2.5	Not Detected
1,2-Dibromoethane (EDB)	0.30	Not Detected		2.3	Not Detected
Chlorobenzene	0.30	Not Detected		1.4	Not Detected
Ethyl Benzene	0.30	28		1.3	120
m,p-Xylene	0.30	98		1.3	420
o-Xylene	0.30	9.2		1.3	40
Styrene	0.30	0.85		1.3	3.6
Bromoform	0.30	Not Detected		3.1	Not Detected
Cumene	0.30	Not Detected		1.5	Not Detected
1,1,2,2-Tetrachloroethane	0.30	Not Detected		2.0	Not Detected
Propylbenzene	0.30	Not Detected		1.5	Not Detected
4-Ethyltoluene	0.30	0.18 J		1.5	0.90 J
1,3,5-Trimethylbenzene	0.30	Not Detected		1.5	Not Detected
1,2,4-Trimethylbenzene	0.30	0.41		1.5	2.0
1,3-Dichlorobenzene	0.30	Not Detected UJ	J	1.8	Not Detected UJ
1,4-Dichlorobenzene	0.30	Not Detected UJ	J	1.8	Not Detected UJ
alpha-Chlorotoluene	1.5	Not Detected UJ	J	7.7	Not Detected UJ
1,2-Dichlorobenzene	0.30	Not Detected UJ	J	1.8	Not Detected UJ
1,2,4-Trichlorobenzene	1.5	Not Detected	J	11	Not Detected
Hexachlorobutadiene	1.5	Not Detected UJ	J	16	Not Detected UJ
Naphthalene	1.5	Not Detected		7.8	Not Detected

J = Estimated value.
E = Exceeds instrument calibration range.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	110	70-130
4-Bromofluorobenzene	102	70-130

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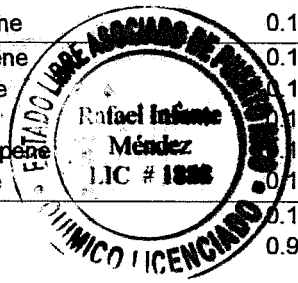
Client Sample ID: BSIA-11 (2014)

Lab ID#: 1412151AR1-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121614r1**	**Date of Collection:**	**12/9/14 10:46:00 AM**
Dil. Factor:	**1.83**	**Date of Analysis:**	**12/16/14 05:37 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.92	0.48 J	4.5	2.4 J
Freon 114	0.18	Not Detected	1.3	Not Detected
Chloromethane	0.92	0.84 J	1.9	1.7 J
Vinyl Chloride	0.18	Not Detected	0.47	Not Detected
1,3-Butadiene	0.18	Not Detected	0.40	Not Detected
Bromomethane	0.92	Not Detected	3.6	Not Detected
Chloroethane	0.92	Not Detected	2.4	Not Detected
Freon 11	0.18	0.21	1.0	1.2
Ethanol	0.92	62 J0	1.7	120 J0
Freon 113	0.18	0.046 J	1.4	0.36 J
1,1-Dichloroethene	0.18	Not Detected	0.72	Not Detected
Acetone	0.92	39	2.2	92
2-Propanol	0.92	28	2.2	70
Carbon Disulfide	0.92	Not Detected	2.8	Not Detected
3-Chloropropene	0.92	Not Detected	2.9	Not Detected
Methylene Chloride	0.37	8.9	1.3	31
Methyl tert-butyl ether	0.18	0.21	0.66	0.77
trans-1,2-Dichloroethene	0.18	Not Detected	0.72	Not Detected
Hexane	0.18	0.17 J	0.64	0.61 J
1,1-Dichloroethane	0.18	Not Detected	0.74	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.92	0.70 J	2.7	2.1 J
cis-1,2-Dichloroethene	0.18	Not Detected	0.72	Not Detected
Tetrahydrofuran	0.92	0.59 J	2.7	1.7 J
Chloroform	0.18	0.058 J	0.89	0.28 J
1,1,1-Trichloroethane	0.18	Not Detected	1.0	Not Detected
Cyclohexane	0.18	Not Detected	0.63	Not Detected
Carbon Tetrachloride	0.18	0.076 J	1.2	0.48 J
2,2,4-Trimethylpentane	0.92	0.83 J	4.3	3.9 J
Benzene	0.18	0.13 J	0.58	0.40 J
1,2-Dichloroethane	0.18	Not Detected	0.74	Not Detected
Heptane	0.18	0.38	0.75	1.6
Trichloroethene	0.18	Not Detected	0.98	Not Detected
1,2-Dichloropropane	0.18	Not Detected	0.84	Not Detected
1,4-Dioxane	0.18	0.12 J	0.66	0.43 J
Bromodichloromethane	0.18	Not Detected	1.2	Not Detected
cis-1,3-Dichloropropene	0.18	Not Detected	0.83	Not Detected
4-Methyl-2-pentanone	0.18	9.0	0.75	37
Toluene	0.18	19	0.69	71
trans-1,3-Dichloropropene	0.18	Not Detected	0.83	Not Detected
1,1,2-Trichloroethane	0.18	Not Detected	1.0	Not Detected
Tetrachloroethene	0.18	Not Detected	1.2	Not Detected
2-Hexanone	0.92	Not Detected	3.7	Not Detected



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Client Sample ID: BSIA-11 (2014)

Lab ID#: 1412151AR1-04A

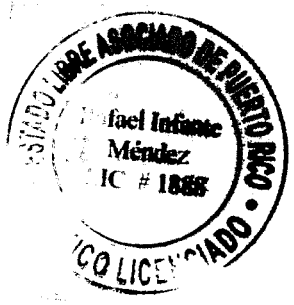
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121614r1**	**Date of Collection: 12/9/14 10:46:00 AM**	
Dil. Factor:	**1.83**	**Date of Analysis: 12/16/14 05:37 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.18	Not Detected		1.6	Not Detected
1,2-Dibromoethane (EDB)	0.18	Not Detected		1.4	Not Detected
Chlorobenzene	0.18	Not Detected		0.84	Not Detected
Ethyl Benzene	0.18	2.5		0.79	11
m,p-Xylene	0.18	8.9		0.79	39
o-Xylene	0.18	1.0		0.79	4.3
Styrene	0.18	0.15 J		0.78	0.64 J
Bromoform	0.18	Not Detected		1.9	Not Detected
Cumene	0.18	Not Detected		0.90	Not Detected
1,1,2,2-Tetrachloroethane	0.18	Not Detected		1.2	Not Detected
Propylbenzene	0.18	Not Detected		0.90	Not Detected
4-Ethyltoluene	0.18	0.097 J		0.90	0.48 J
1,3,5-Trimethylbenzene	0.18	Not Detected		0.90	Not Detected
1,2,4-Trimethylbenzene	0.18	0.12 J		0.90	0.57 J
1,3-Dichlorobenzene	0.18	Not Detected UJ	J	1.1	Not Detected UJ
1,4-Dichlorobenzene	0.18	Not Detected UJ	J	1.1	Not Detected UJ
alpha-Chlorotoluene	0.92	Not Detected UJ	J	4.7	Not Detected UJ
1,2-Dichlorobenzene	0.18	Not Detected UJ	J	1.1	Not Detected UJ
1,2,4-Trichlorobenzene	0.92	Not Detected	J	6.8	Not Detected
Hexachlorobutadiene	0.92	Not Detected UJ	J	9.8	Not Detected UJ
Naphthalene	0.92	Not Detected		4.8	Not Detected

J = Estimated value.
J0 = Estimated value due to bias in the CCV.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	106	70-130
4-Bromofluorobenzene	97	70-130



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Client Sample ID: BSIA-9 (2014)

Lab ID#: 1412151AR1-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121615r1**	**Date of Collection:**	**12/9/14 10:50:00 AM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/16/14 06:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.80	0.51 J	4.0	2.5 J
Freon 114	0.16	Not Detected	1.1	Not Detected
Chloromethane	0.80	0.97	1.7	2.0
Vinyl Chloride	0.16	Not Detected	0.41	Not Detected
1,3-Butadiene	0.16	Not Detected	0.36	Not Detected
Bromomethane	0.80	Not Detected	3.1	Not Detected
Chloroethane	0.80	Not Detected	2.1	Not Detected
Freon 11	0.16	0.19	0.90	1.1
Ethanol	0.80	62 J0	1.5	120 J0
Freon 113	0.16	0.068 J	1.2	0.52 J
1,1-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Acetone	0.80	42	1.9	100
2-Propanol	0.80	28	2.0	70
Carbon Disulfide	0.80	Not Detected	2.5	Not Detected
3-Chloropropene	0.80	Not Detected	2.5	Not Detected
Methylene Chloride	0.32	9.4	1.1	33
Methyl tert-butyl ether	0.16	0.22	0.58	0.81
trans-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Hexane	0.16	0.20	0.57	0.70
1,1-Dichloroethane	0.16	Not Detected	0.65	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.80	0.82	2.4	2.4
cis-1,2-Dichloroethene	0.16	Not Detected	0.64	Not Detected
Tetrahydrofuran	0.80	0.59 J	2.4	1.7 J
Chloroform	0.16	0.097 J	0.79	0.47 J
1,1,1-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Cyclohexane	0.16	Not Detected	0.55	Not Detected
Carbon Tetrachloride	0.16	0.098 J	1.0	0.62 J
2,2,4-Trimethylpentane	0.80	0.74 J	3.8	3.5 J
Benzene	0.16	0.15 J	0.51	0.47 J
1,2-Dichloroethane	0.16	Not Detected	0.65	Not Detected
Heptane	0.16	0.44	0.66	1.8
Trichloroethene	0.16	Not Detected	0.86	Not Detected
1,2-Dichloropropane	0.16	Not Detected	0.74	Not Detected
1,4-Dioxane	0.16	Not Detected	0.58	Not Detected
Bromodichloromethane	0.16	Not Detected	1.1	Not Detected
cis-1,3-Dichloropropene	0.16	Not Detected	0.73	Not Detected
4-Methyl-2-pentanone	0.16	8.8	0.66	36
Toluene	0.16	19	0.61	72
trans-1,3-Dichloropropene	0.16	Not Detected	0.73	Not Detected
1,1,2-Trichloroethane	0.16	Not Detected	0.88	Not Detected
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected
2-Hexanone	0.80	0.12 J	3.3	0.51 J

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Client Sample ID: BSIA-9 (2014)

Lab ID#: 1412151AR1-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**v121615r1**	**Date of Collection:**	**12/9/14 10:50:00 AM**
Dil. Factor:	**1.61**	**Date of Analysis:**	**12/16/14 06:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)		Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.16	Not Detected		1.4	Not Detected
1,2-Dibromoethane (EDB)	0.16	Not Detected		1.2	Not Detected
Chlorobenzene	0.16	Not Detected		0.74	Not Detected
Ethyl Benzene	0.16	2.6		0.70	11
m,p-Xylene	0.16	9.3		0.70	40
o-Xylene	0.16	0.93		0.70	4.0
Styrene	0.16	0.17		0.68	0.72
Bromoform	0.16	Not Detected		1.7	Not Detected
Cumene	0.16	Not Detected		0.79	Not Detected
1,1,2,2-Tetrachloroethane	0.16	Not Detected		1.1	Not Detected
Propylbenzene	0.16	Not Detected		0.79	Not Detected
4-Ethyltoluene	0.16	0.069 J		0.79	0.34 J
1,3,5-Trimethylbenzene	0.16	Not Detected		0.79	Not Detected
1,2,4-Trimethylbenzene	0.16	0.13 J		0.79	0.66 J
1,3-Dichlorobenzene	0.16	Not Detected UJ	J	0.97	Not Detected UJ
1,4-Dichlorobenzene	0.16	Not Detected UJ	J	0.97	Not Detected UJ
alpha-Chlorotoluene	0.80	Not Detected UJ	J	4.2	Not Detected UJ
1,2-Dichlorobenzene	0.16	Not Detected UJ	J	0.97	Not Detected UJ
1,2,4-Trichlorobenzene	0.80	Not Detected	J	6.0	Not Detected
Hexachlorobutadiene	0.80	Not Detected UJ	J	8.6	Not Detected UJ
Naphthalene	0.80	Not Detected		4.2	Not Detected

J = Estimated value.
J0 = Estimated value due to bias in the CCV.
UJ = Analyte associated with low bias in the CCV and/or LCS.
Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	94	70-130

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

Project Manager Terry Taylor
Collected by: (Print and Sign) TAA
Company AMAI Email
Address 110 Corporate Pk City White Plains State NY Zip 10604
Phone 914-251-0400 Fax

Project Info:
P.O. #
Project # Building 5 VI
Project Name BMS - Humacao

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	BSIA-5(2014)	34723	12/8/14	1555	see note	30+	5		
02A	BSIA-3D(2014)	35255	12/9/14	0930	"	30+	16		
03A	BSIA-3(2014)	34450	12/9/14	0920	"	30+	3.5		
04A	BSIA-11(2014)	1651	12/9/14	1046	"	30+	8.5		
05A	BSIA-9(2014)	34440	12/9/14	1050	"	28	5		
	Do Not Analyze (Bad Pc)	16910							

Relinquished by: (signature) Date/Time: 12/9/14; 1115
Received by: (signature) Date/Time: hand mylaid EAIL 12/10/14 1010
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes: Acetone, Benzene, Ethylbenzene, Isopropyl Alcohol, Methanol, MiBK, Toluene, Xylene via TO-15. Methane via ASTM D-1946

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx	772146997180	NA	Good	Yes No (None)	141215

Form 1293 rev.11

DATA REVIEW WORKSHEETS

Project Number:_____1412151AR1_____
Date:_____12/08-09/2014_____

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Eurofins_-_Air_Toxics_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __1412151AR1_____ Sample matrix: ___Air_____
No. of Samples: _____5_____

Trip blank No.: ____-_____
Field blank No.: _____-_____
Equipment blank No.:___-_____
Field duplicate No.:_____BSIA-3/BSIA-3D_____

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ Internal Standard Performance
___X___ Blanks
___X___ Surrogate Recoveries
___N/A_ Matrix Spike/Matrix Spike Duplicate
___X___ Laboratory Control Spikes
___X___ Field Duplicates
___X___ Calibrations
___X___ Compound Identifications
___X___ Compound Quantitation
___X___ Quantitation Limits

Overall Comments:_VOCs_by_method_TO-15_____
_____

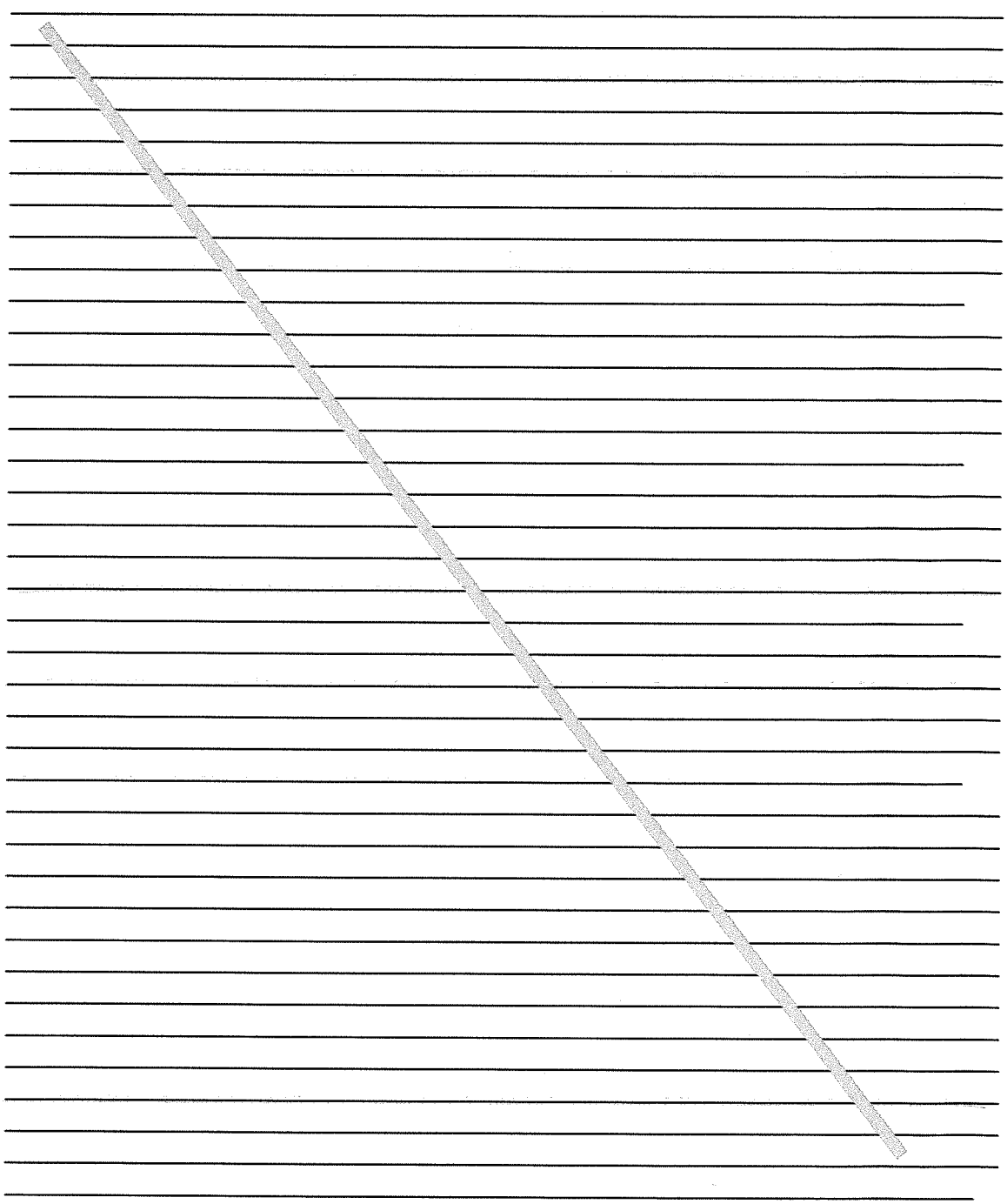
Definition of Qualifiers:
J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Defant
Date:__ 07/08/2015_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED



All criteria were met __X__
Criteria were not met
and/or see below _____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): N/A – summa canisters

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

All criteria were met __X__
Criteria were not met see below _____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X__ The BFB performance results were reviewed and found to be within the specified criteria.

__X__ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:
_____

If mass calibration is in error, all associated data are rejected.

All criteria were met _____
Criteria were not met
and/or see below ___X___

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____10/06/14_____
Dates of continuing calibration:____12/16/14___
Instrument ID numbers:____MSD-V_____
Matrix/Level:_____Air/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibration met the method performance criteria except for the followings:				
10/06/14	V14L1006D	34 % RSD	1,2,4-trichlorobenzene	All samples.
12/16/14	V121602.d	38 % D	Ethanol	
		38 % D	1,2-dichlorobenzene	
		32 % D	1,3-dichlorobenzene	
		37 % D	1,4-dichlorobenzene	
		33 % D	alpha-chlorotoluene	
		39 % D	Hexachlorobutadiene	

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be $\leq$ 15 % regardless of method requirements for CCC.
All %Ds must be $\leq$ 30% regardless of method requirements for CCC.
Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of $\geq$ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

All criteria were met _____
Criteria were not met
and/or see below ___X___

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION/ UNITS
All_method_blank_meeth_method_specific_criteria_except_for_the_followings:				
12/16/14	1412151AR1-09A	Air/low	Hexane	0.10 ppbv
			1,4-dichlorobenzene	0.038 ppbv
			alpha-chlorotoluene	0.10 ppbv
			1,2-dichlorobenzene	0.046 ppbv
			1,2,4-trichlorobenzene	0.12 ppbv
			hexachlorobutadiene	0.043 ppbv

Note: No action taken, blank concentration < 5 X SQL

Summa_canisters_met_cleaning_certification_criteria

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No_field/trip/equipment_blanks_analyzed_with_this_data_package.				

All criteria were met __X__
Criteria were not met
and/or see below _____

V B. BLANK ANALYSIS RESULTS (Section 3).

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and ≤ AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but ≤ AL, report the compound as not detected (U) at the reported concentration.
If the concentration is ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

All criteria were met _____
Criteria were not met
and/or see below __N/A____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.
Sample ID:_____ Matrix/Level:_____

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
MS/MSD are not required as part of Method TO-15; blank spike used to assess accuracy					

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met _____
Criteria were not met
and/or see below __N/A___

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Method TO-15 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID:_____ Matrix/Level/Unit:_____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

All criteria were met ___X___
Criteria were not met
and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? Yes or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID	COMPOUND	% R	QC LIMIT
___LCS/LCSD_%_recoveries_and_RPD_within_laboratory_control_limits_except_for_the_____followings:_____			
____1412151AR1-08A/-08AA____	1,2,4-trimethylbenzene_____	143_%/142_%___	70_-_130____
_____	alpha-chlorotoluene_____	167_%/159_%___	70_-_130____
_____	Ethanol_____	149_%/152_%___	70_-_130____

Note: Sample results qualified accordingly in affected sample.

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? **Yes** or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met __X___
Criteria were not met
and/or see below _____

IX. LABORATORY DUPLICATE PRECISION

Sample IDs: __LCS/LCSD_____ Matrix:___Air____

Laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within laboratory and generally acceptable control limits.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met _____
Criteria were not met
and/or see below ___X___

IX. FIELD DUPLICATE PRECISION

Sample IDs: __BSIA-3/BSIA-3D_____ Matrix:___Air_____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
Freon 113	0.02025	0.060	ND	NR	No action
2,2,4-trimethylpentane	0.04952	ND	0.28	NR	Qualify results (J) in sample and duplicate.
1,2,4-trimethylbenzene	0.03467	0.41	0.30	31	Qualify results (J) in sample and duplicate.
RPD within generally acceptable control limits for all other analytes.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met __X__
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

* Area of +40% or -40% of the IS area in the associated calibration standard.
* Retention time (RT) within ± 0.06 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

_Internal_standard_area_and_retention_times_within_laboratory_control_limits_for_both_samples_and_calibration_standards_____

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > + 40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

All criteria were met __X__
Criteria were not met
and/or see below _____

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1412151AR1-01A

Toluene RF = 1.62872

[ ] = (6014361)(5.0)/(424896)(1.62872)

= 43.45 ppbv OK

All criteria were met __X__
Criteria were not met
and/or see below _____

XII. QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASONS FOR DILUTION
Dilution was performed on samples by a factor of less than 2 except the following:		
1412151AR1-01A	7.90	High levels of target species.
1412151AR1-03A	2.98	High levels of target species.

B. Percent Solids

List samples which have $\leq$ 50 % solids

Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)